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Richland Operations Office
P.O. Box 550
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94-RPA-057

JAN 21 1994

Mr. David C. Nylander
State of Washington
Department of Ecology
Hanford Project Office
7601 West Clearwater Avenue, Suite 102
Kennewick, Washington 99336

Dear Mr. Nylander:

SAMPLING AND ANALYSIS PLAN FOR CONTAMINATED TANK FARMS CONTAINERIZED SOIL

Enclosed is a Sampling and Analysis Plan (SAP) for contaminated Tank Farms containerized soil managed by the Westinghouse Hanford Company Waste Tank Operations Division. This SAP describes how containerized contaminated soil will be sampled and analyzed to collect data on the presence of listed waste constituents (specifically F001 - F005 spent solvents).

The data collected pursuant to this SAP will be transmitted to the State of Washington Department of Ecology (Ecology) for Ecology's use in making a determination under the "contained-in" policy.

Please review this SAP at your earliest convenience. Samples will not be taken in accordance with this SAP until Ecology provides written direction regarding this SAP. If you have any questions or need more information, please contact Mr. Paul J. Krupin of my staff on (509) 372-1112.

Sincerely,

James D. Bauer

James D. Bauer, Program Manager
Office of Environmental Assurance,
Permits, and Policy

EAP:PJK

Enclosure

cc w/encl:
B. J. Dixon, KEH
B. G. Erlandson, WHC
C. J. Geier, WHC
H. T. Tilden, PNL
D. R. Sherwood, EPA
T. G. Tebb, Ecology

ENCLOSURE
Consisting of 25 Pages

SAMPLING AND ANALYSIS PLAN
FOR CONTAMINATED TANK FARMS CONTAINERIZED SOIL

SAMPLING AND ANALYSIS PLAN
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1.0 Introduction

The Hanford Facility manages mixed wastes in underground storage tank systems. These tank systems are grouped in tank farms located in the 200 East and 200 West Areas, and include the Single Shell Tanks, the Double Shell Tanks, the 242-A Evaporator, and associated ancillary equipment such as piping, pumps, diversion boxes, and catch tanks. For the purpose of this Sampling and Analysis Plan (SAP), these tank systems will be referred to as the tank farms, although it should be understood that some of the components of the tank systems (such as piping, diversion boxes, catch tanks) are physically located outside the tank farms.

Wastes stored in the tank systems are designated as mixed wastes. Mixed waste are those wastes which have a dangerous chemical component regulated pursuant to the Washington Administrative Code (WAC) Chapter 173-303, "Dangerous Waste Regulations", and a radioactive component regulated pursuant to U. S. Department of Energy Orders (DOE Orders). The dangerous waste designation is based on the presence of listed non-specific source spent solvents (F001 through F005) in the tank farms waste, and because the tank farms waste exhibits dangerous waste characteristics and criteria.

Historic leaks and releases from the tank farms have resulted in contaminated soil in the tank farms. Maintenance and upgrade activities routinely result in the excavation and containerization of this soil. The Washington State Department of Ecology (Ecology) has adopted a Contained-In Policy for management of environmental media that included soil, surface water, and groundwater (Ecology 1993).[1] This policy states that soil contaminated with a listed waste must be managed as a dangerous waste until the soil no longer contains that dangerous waste.

The presence of radioactive constituents in the soil is an indicator that tank farms waste may have contaminated the soil. Accordingly, radioactively contaminated soil from the tank farms is currently being managed as a mixed waste. It is assumed that listed waste constituents may be present in the contaminated soil in some small concentration.

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[1] The contained-in policy has not yet been codified in Chapter 173-303 WAC. The U. S. Environmental Protection Agency (EPA) has established language in Title 40 of the Code of Federal Regulations (CFR) 261.3(f) for this policy as applied to debris, and has proposed inclusion of the contained-in policy for environmental media at 40 CFR 261.3(g) and 261.4(a)(13) (See 58 Federal Register 48123).

Once designated, the contained-in policy states that the soil must be managed as a mixed waste until it can be demonstrated that the soil does not contain listed waste constituents.

2.0 Purpose

This SAP has been prepared to describe the process by which data will be collected on contaminated tank farms containerized soil (hereinafter referred to as tank farms soil). It is expected that the data will show that this soil does not contain listed waste constituents above site-specific risk-based levels (Model Toxics Control Act [WAC 173-340] residential standards). This would allow redesignation of the soil as non-listed waste pursuant to Ecology's contained-in policy. Such a redesignation would ensure management of the soil in a manner consistent with the hazards actually present, and would result in significant cost savings at Hanford.

Should the data show that tank farms soil contains listed waste constituents above MTCA residential standards, the data will be used to develop recommendations for alternate safe uses for the soil in lieu of disposal as a mixed waste.

3.0 Organizational Responsibilities

3.1 Tank Farms Environmental Compliance Officer (ECO)

The Tank Farms ECO or delegate has the overall responsibility for implementation of this SAP. The Tank Farms ECO will ensure that the sampling efforts are scheduled and performed pursuant to this SAP, and that appropriate records of the sampling activities are maintained. The Tank Farms ECO is also responsible for providing direction to the laboratory to resolve any problems.

The Tank Farms ECO is responsible for preparation of the Contaminated Tank Farms Containerized Soil Characterization Report. This report will include a comparison of the analytical data for tank farms soil against the MTCA residential standards for the listed waste constituents. If the comparison shows that the tank farms soil does not contain listed waste constituents above the MTCA standards, the Tank Farms ECO will recommend to Ecology that the soil no longer contains a dangerous waste. If the data show that tank farms soil contains listed waste constituents above MTCA residential standards, the Tank Farms ECO may recommend to Ecology alternate safe uses for the soil in lieu of disposal as a mixed waste.

The Tank Farms ECO is responsible for initiating any changes in the management of tank farms soil which result from this SAP.

3.2 Sampling and Mobile Laboratories (SML)

The SML will conduct the sampling of the tank farms soil. SML will also prepare the samples for shipment, maintain a field logbook, prepare chain-of-custody records, and ship the samples. As part of the sampling effort preparation, the SML also ensure that all sampling equipment is either decontaminated or is contaminant free.

3.3 Hanford Analytical Services Management (HASM)

HASM is responsible for establishing statements of work to fulfill Hanford Facility laboratory analytical needs. HASM coordinates analysis of samples at on-site and off-site laboratories and is the central point of contact for the laboratories. HASM will notify the Tank Farms ECO of any problems the laboratories may experience in the course of analysis, and will relay the Tank Farms ECO's direction back to the laboratories. After analytical data is received from the laboratory, HASM will validate the data in accordance with approved procedures for dangerous waste samples. HASM also maintains the original hard copy of the laboratory data package received from each sampling effort.

3.4 Ecology

Ecology will approve this SAP and the Contaminated Tank Farms Containerized Soil Characterization Report. Ecology will approve the Tank Farms ECO's recommended designation of the soil based on the analytical results obtained pursuant to this SAP. Ecology will also approve any proposed alternative uses if any tank farms soil contains listed waste constituents above the MTCA residential standards.

4.0 Data Quality Objectives

4.1 Waste Designation

Data Quality Objectives (DQO) are determined before sampling begins and are derived from the decisions that must be made once the analytical data is received from the laboratory and evaluated.

The data collected pursuant to this SAP will be used to determine whether the tank farms soil, when compared to residential risk-based standards under MTCA, contains organic contaminants (from listed non-specific source spent solvents) in concentrations which warrant management as a mixed waste. Attachment 1 summarizes how the MTCA standards which will be the basis for this comparison were determined. The data must meet the quality assurance standards of WAC 173-303-110, and analytical method detection limits for the listed waste constituents must be below the MTCA residential standards to allow this

comparison. Table 1 identifies the analytical parameters, test methods, and detection limits to support this determination.

This data will be reported in Section F of the Contaminated Tank Farms Containerized Soil Characterization Report.

Table 1

Analytical Parameters Related to Soil Drum Sampling

Analytical parameter	Analytical Method	Required detection limit	Attachment 1 MTCA Values
A. Listed Waste Constituents	SW-846 8240(1)		
Total Volatiles			
Acetone		1 mg/kg	80 mg/kg(2)
Methyl ethyl ketone		1 mg/kg	480 mg/kg
Methyl isobutyl ketone		1 mg/kg	40 mg/kg
Methylene chloride		0.1 mg/kg	0.58 mg/kg
1,1,1 Trichloroethane		1 mg/kg	72 mg/kg
Total Semi-volatiles	SW-846 8270(1)		
o-Cresol		5 mg/kg	80 mg/kg
p-Cresol		5 mg/kg	80 mg/kg

(1) The method used may be a method promulgated by EPA (EPA 1986), if appropriate. If radiological contamination does not allow for use of these procedures, equivalent or on-site Hanford Facility procedures will be used.

(2) MEK could be regulated at 200 mg/l under the Toxicity Characteristic (D035).

4.2. Data Specific Objectives

The quality of the data are assessed through the following quality indicators: (1) analytical method detection limits, (2) precision and accuracy, and (3) completeness, representativeness, and comparability.

4.2.1 Analytical Method Detection Limits

Based upon expected radiological activity levels, a matrix detection limit for the volatile organic analyses in the soils should be a maximum of 1 ppm (mg/kg) with the exception of methylene chloride. The detection limit for methylene chloride's must be 0.1 mg/kg. A matrix detection limit of 5 ppm has been established for the semi-volatile analyses. Chemical contamination is

not expected to create interferences in the soil matrix and should not be a factor. In fact, method detection limits for volatile and semivolatile analysis at off-site laboratories range from a factor of 100-1,000 below these desired matrix detection limits. These matrix detection limits will address MTCA comparison considerations. When a sample requires dilution, the matrix detection limit will be calculated as the detection limit for the particular matrix times the dilution factor. The laboratory should try to achieve the lowest detection limit possible for all constituents of interest.

If the required matrix detection limit cannot be obtained for the organic constituents, the laboratory will stop work and immediately contact HASM. The laboratory should also make recommendations on how to proceed including additional cleanup methods that may allow the detection limit to be reached. HASM will in turn notify the Tank Farms ECO who will provide direction as to whether (1) the laboratory should proceed even though the detection limit cannot be achieved, (2) the laboratory should implement the additional cleanup techniques to achieve better detection limits, or (3) the work should be discontinued since the expected detection limits are not adequate to evaluate the contaminants in accordance with the MTCA comparison.

4.2.2 Precision and Accuracy

Precision will be defined in terms of relative percent difference of the matrix spike and the matrix spike duplicate. Precision will be calculated using the following equation for relative percent difference (RPD):

$$RPD(\%) = \frac{(C_1 - C_2)}{(C_1 + C_2/2)} \times 100$$

Where:

RPD = relative percent difference;
C_1 = the larger of the two values; and
C_2 = the smaller of the two values.

Note that acceptable limits for precision are not being specified at this time. Any RPD results, however, should be reported in the final data packages received from the laboratory and will be included in the ensuing characterization report to Ecology.

Accuracy will be defined in terms of percent recovery of laboratory matrix spikes. A matrix spike will be consist of the organic species that are routinely used for analysis under WHC statements of work. These constituents are identical to the constituents recommended by EPA for soil analysis (EPA

1990). The spike concentration will be consistent with the laboratory SOW's. Spiking will be completed at the laboratory prior to extraction or digestion of the sample. If a laboratory receiving the samples uses different spiking concentrations than that recommended by EPA (EPA 1986), those concentrations can be used if they do not interfere with data reporting and the presentation of precision and accuracy values in the characterization report.

EPA recommends that recoveries for the matrix spike and matrix spike duplicate should be at least 20 percent and less than 200 percent (EPA 1990). Hanford criteria for validation uses values of 50 to 150 percent. If recoveries fall outside of the current Hanford validation range, the validation report will be flagged. The characterization report that is submitted to Ecology will list the recoveries that were achieved. Review of data on a case-by-case basis will determine whether the results are usable. The following equation will be used to calculate recoveries:

$$Recovery(\%) = \frac{(C_i - C_o)}{C_t} \times 100$$

Where:

C_i = concentration of spiked aliquot;
C_o = concentration of unspiked aliquot; and
C_t = concentration of spike added

Every 20th drum of mixed waste managed soil sampled under this SAP will have three times the amount of sample collected to address precision and accuracy. This sample amount will allow for the analysis of the actual sample, matrix spike, and matrix spike duplicate. As determined by the field logbook maintained by the Tank Farms ECO at the 209-E Facility, every 20th mixed waste drum sampled in accordance with this SAP will have enough sample collected to address precision and accuracy.

4.2.3 Completeness, Representativeness, and Comparability

Completeness is defined as the number of activities initiated that are actually finished. The first activity is acquiring the samples and the last activity is reporting the analytical data. The degree of completeness is the number of samples for which acceptable analytical data are generated divided by the total number of samples times 100. The quality assurance objective for completeness is 100 percent. If completeness is less than 100 percent, documentation will be provided to explain why this objective was not met and describe the impact.

Representativeness is addressed through random selection of drums of tank farms soil from projects, maintenance, and operational activities. There are currently more than 900 drums of tank farms soil stored at the Central Waste Complex. This soil was generated over several years, and represents the full spectrum of activities which may generate soil at tank farms. For preliminary analysis, 50 drums of tank farms soil will be sampled. These drums will be chosen at random from the tank farms soil at the Central Waste Complex (CWC).

When all 50 drums have been sampled, analytical results will be validated and statistically evaluated relative to the MTCA residential thresholds for F-listed constituents. The statistical analysis will be the Student T distribution computed as a one-sided 90% confidence interval for the concentration of each constituent, in accordance with SW-846 procedures. If the MTCA value lies outside the confidence interval, no additional samples will be taken. If the MTCA limits lie within the one-sided 90% confidence interval, additional samples will be taken until there is sufficient statistical confidence to establish whether the constituent concentrations are above or below MTCA levels.

Comparability is addressed through the use of the same analytical procedures to analyze all of the samples and the same procedures used in the collection, storage and preparation of the samples. The analytical data will be reported in the same units for each test for all samples collected from a site. SML will be used for all of the sampling efforts and will use the same procedures each time a sampling effort is initiated.

5.0 Site Information

Projects, maintenance and operational activities in or around the tank farms often result in the excavation of contaminated soil. Soil is returned to the excavation if appropriate from a radiological safety perspective. Occasionally, radiological safety considerations require that contaminated soil be containerized instead of being returned to the excavation. Contaminated soil is managed as a mixed waste if the soil originated from inside a fenced tank farm. Contaminated soil containerized inside a tank farm will be presumed to "contain" a dangerous waste. When soil is containerized outside of a tank farm, the excavation or site contamination must be evaluated to determine if the soil "contains" a dangerous waste. For example, if a tank farms transfer line is near the excavation and radiological contamination is found at levels higher than general background contamination, the soil will be managed as mixed waste. In this case, it is presumed that the transfer line may have failed and the soil "contains" a dangerous waste.

Tank farms soil is managed in 55-gallon drums. Newly generated drums are either managed in a satellite accumulation area at the point of generation, or taken directly to the less than 90-day storage pad near the 209-E Building. The tank farms soil containers are managed as mixed waste and sent to the CWC for longer term storage.

More than 900 drums of tank farms soil from past waste management activities are currently being stored at the CWC. This soil was generated over several years, and represents the full spectrum of activities which may generate soil at tank farms.

If the data collected pursuant to this SAP supports re-designation of the soil as a non-dangerous low-level radioactive waste, these tank farms soil containers may be removed from the Central Waste Complex and managed per DOE Orders.

6.0 Sampling and Analytical Activities

Selection of drums for sampling will be performed in accordance with section 4.2.3. Drums of existing waste will be sampled at the Central Waste Complex (CWC) or at T Plant, while newly generated tank waste contaminated soil will be sampled at the 209-E Facility.

Drums will be sampled using SW-846 methods whenever possible. The objective is to obtain several core samples of soil to the full depth of the drum. Loose, sandy soils may be sampled with a grain sampler. Other soils will be sampled using an auger. If the nature of the waste requires use of other sampling methods, SML will describe in detail the method and rationale for its use in the sample logbook.

When a drum will be sampled, the drums will be logged into a field logbook. The field logbook will be maintained at the 209-E Facility and will be bound and have consecutively numbered pages so that pages cannot be removed or inserted. Information will be recorded in the field logbook that supports the report writing efforts. This information includes, but is not limited to: drum number, originating tank farm or project generating the soil (if known), sampling date, sample numbers, Matrix Spike and Matrix Spike Duplicate samples taken on every 20th drum, field QA/QC samples taken, and SML personnel performing the sampling.

In addition, all sampling activities will be recorded in the SML logbook. The SML sample logbooks are bound and have consecutively numbered pages. Pages will not be inserted into or removed from the logbook. Information recorded in the logbook will include, but is not limited to the following: drum number, originating tank farm or project generating soil, sampling date, sample dose rate, sample numbers, QA/QC samples, and name and title of person performing

sampling. The 209-E Field logbook, in conjunction with the SML logbook, will satisfy recordkeeping requirements so that a quality characterization report to Ecology can be developed.

The sampling procedure is as follows.

1) Each drum will be radiologically surveyed with external hand held radiological instrumentation or assay equipment to identify any hot spots.

2) If no hot spots are identified, a six point composite sample will be obtained from the drum. If one or more hot spots are identified, each hot spot will be sampled and composited with samples from four additional sample points (EPA 1990).

3) All soil collected from the sample points will be placed into a mixing bowl and mixed. Sample aliquots will be quickly transferred to the sample containers to minimize loss of volatile constituents.

4) Three times the required sample volume will be collected from every twentieth drum to allow for the matrix spike and matrix spike duplicate analysis.

Quality assurance and quality control procedures are addressed in section 7. Sample containers, preservatives and holding times are identified in section 7.2, Table 3.

7.0 Quality Assurance/Quality Control Procedures

Quality Assurance/Quality Control (QA/QC) considerations are addressed both in the field and in the laboratory. The field logbook at the 209-E Facility will be used to determine when the additional field QA/QC samples are to be taken. Laboratory QA/QC will be performed consistent with the SOW that establishes the requirements for each laboratory.

7.1 Field QA/QC considerations

7.1.1 Representativeness

Sampling locations in the container will be chosen to be representative of the soil with the highest contamination. Collection of soil with the highest contamination will ensure that the DQO will be met. The sample volumes to be collected must be sufficient for measurement of all parameters of interest. Debris will be removed from all samples. To complete sample compositing in the field (or sample trailer), soil samples will be mixed before sample

aliquots are taken to be placed into the sample containers. Mixing however will be minimized to ensure that the loss of volatile constituents is not a concern during sample collection.

7.1.2 Containers

All sample containers will be cleaned by the vendors. Only new sample containers will be used. The SML only uses sample containers that are accompanied by a vender certification of cleanliness.

7.1.3 Blanks and Duplicates

Blank samples (i.e., equipment blanks, trip blanks, and field blanks) will be taken during these characterization sampling efforts. A sampling effort is defined as each day SML comes out to a sampling location. The sampling location could either be the 209-E Facility for newly generated drums, or somewhere else if CWC drums will be sampled. One equipment blank per sampling effort will be obtained if the sampling equipment is to be decontaminated and reused in the field the same day. If enough sampling equipment is brought so that decontamination techniques in the field are not required, equipment blanks are not required. The SML field logbook will indicate if equipment blanks are taken. SML will usually bring sufficient amounts of sampling equipment to avoid performing equipment decontamination is the field, and hence equipment blanks will not usually be taken.

One trip blank per sampling effort will be taken. A trip blank is not opened in the field. The trip blank will be used to determine whether any contamination resulted from sample transport, shipping, or site conditions. The trip blank will be analyzed for the same limited number of volatile constituents that the actual samples will be subject to. The trip blanks will consist of contaminant free silica sand. Trip blanks will be packaged and shipped with the sample containers throughout the entire process.

Field blanks will be collected to ensure that volatile organic contamination has not occurred. One field blank per sampling effort at 209-E will be obtained. Each field blank will consist of contaminant free silica sand taken to the field and transferred into a sample container in the area where the samples are taken. Field blank analysis will only consist of the volatile constituents discussed in this SAP.

If constituents of interest are measured in the blank, documentation will be presented in the report explaining the impact of the contamination on the samples collected. Table 2 summarizes the frequency and analytical parameters for the field QA/AC samples.

Table 2

Frequency and Analytical Parameters for QA/QC Field Samples

Sample Type	Frequency	Analysis
Equipment blank	N/A unless equipment is decontaminated and reused the same day.	N/A unless equipment is decontaminated and reused the same day.
Trip blank	One per sampling day.	Total Volatiles
Field blank	One per sampling day.	Total Volatiles

7.1.4 Sample Preservation and Containerization

All samples will be preserved in the field (or sample trailer) in accordance with EPA protocols. When samples are shipped off-site from the Hanford Facility, radiological analysis must be conducted on-site to obtain information to properly ship the sample. This analysis may take one to two days. Thus, the delay associated with radiological analysis may adversely impact our ability to meet sample holding times. When a holding time has not been met, the data will be flagged in the report. In most cases, exceeding a holding time will not disqualify a data point. Best engineering judgement must be used in these cases to make this decision on a case-by-case basis. Table 3 presents the information relating to the container types, preservatives, and holding times for this SAP.

7.2 Laboratory QA/QC considerations

Laboratory QA/QC considerations are established through the development of Statements Of Work (SOW) with each laboratory. A comprehensive discussion of requirements for sample handling, analysis requirements including detection limits, methods used, result reporting, QA/QC, and notifications are included within each SOW. Laboratory SOW's are maintained by HASM.

8.0 Sample Custody and Transport

Sample custody and transport involves the custody of the sample while in the field, custody while in transport, and custody in the receiving laboratory. The following sections address these three situations.

Table 3

Sample Container size, Preservatives and Holding Times for Solids/Sediments[1]

Parameters	Container	Sample size[2]	Holding Time	Preservation
Volatile Organics	Amber glass	1-120 ml jar	14 days	Cool 4°C
Semi-volatile organics	Amber glass	1-250 ml jar	14 days to extraction, 40 days to analysis	Cool 4°C

(1) EPA 1990.
(2) For samples requiring accuracy and precision analyses (MS and MSD), collect three times the amount. Samples sizes may vary depending on the laboratory receiving the samples.

8.1 Field Custody

All samples collected for chemical analysis will be labelled and identified with a sample label (see Attachment 4). The sample label contains information to allow sample identification when compared to associated paperwork and other like samples. The label will include, but is not limited to, the sample number, name of the collector, place of collection and time of collection. Sample seals will also be applied to the sample container around the lid to detect unauthorized tampering (see Attachment 4). The sample seals must be affixed at the time of packaging by the SML.

Sample custody will begin, in all cases, at the time of sample collection. The SML personnel will be the initial custodian of the samples. A line on the chain of custody form will be immediately filled out and signed by the SML. Upon completion of all items on the chain of custody, the sample custodian will sign the form (see Attachment 5). SML will deliver the samples to either the on-site laboratory or the shipping department for off-site laboratories. The field chain of custody will terminate upon laboratory receipt of samples.

8.2 Sample Transport

Samples must be packaged and labelled for shipment in compliance with current U.S. Department of Transportation (DOT) and International Air Transport Association (IATA) regulations. In addition, the overnight carrier may require additional packaging or labelling for the sample.

Standard ice chests will be used to ship the samples in. The ice chests are packaged to assure that the samples will remain cooled during shipment as well

and can be expected. The labelled, sealed samples are double bagged in plastic. Vermiculite or bubble wrap is placed in between the sample containers to avoid breakage during transport.

Chain of Custody records and other shipping/sample documentation accompanying the shipment will be enclosed in a waterproof plastic bag and taped to the underside of the ice chest lid. Each ice chest will be securely taped shut. Custody seals will be placed across the lid joint on the ice chest prepared for off-site shipment. The ice chest will be marked in accordance with all applicable shipping requirements.

8.3 Laboratory Sample Custody

Samples will arrive at the laboratory via delivery by SML or the overnight carrier service. After the ice chests are checked for intact custody seals, the sample will be unpacked and the information on the accompanying chain of custody records will be examined. If the samples shipped match those described on the chain of custody, the laboratory sample custodian will sign the form and assume responsibility for the samples. If problems are noted with the sample shipment, the laboratory custodian will sign the form and record problems in the "Remarks" box. If the problems are significant and could jeopardize the analysis, the laboratory will immediately call HASM. HASM will in turn immediately contact the Tank Farms ECO. The Tank Farms ECO will provide direction on whether the laboratory should either proceed with the analysis or terminate the analysis.

9.0 Analytical Methods, Data Handling, Validation and Reporting

9.1 Analytical methods

Analytical methods to be used for the data collection effort of this program will be selected, whenever possible, from EPA approved methods. These methods for the most part, appear in SW-846 (EPA 1986). Exception to the requirements will be allowed for cases in which the EPA approved methods are not appropriate for the preparation or analysis of radiologically contaminated soil. The SW-846 methods are indicated in Table 1. The laboratory receiving the samples will document the method used in the final data report, and methods other than SW-846 will be indicated in the characterization report. Any unexpected deviations or modifications required to analyze the various samples will also be documented.

9.2 Data Handling

HASM will receive the data packages from the laboratories. The data packages will consist of information dictated by the Statement of Work for each laboratory. The sample delivery groups on each data packages can vary based

on specific field sampling considerations. The number of samples in each sample delivery group may vary from one to twenty.

HASM will maintain the copy of the analytical data package received from the laboratory and make a copy of relevant information to be sent to the Tank Farms ECO. If the data package is one which requires validation, HASM will validate the data. The Tank Farms ECO is evaluating electronic databases to be used for the data collected pursuant to this SAP. The Tank Farms ECO will notify Ecology when a database has been selected.

9.3 Data Validation

Based upon practices used in the Environmental Restoration Program, HASM will validate ten percent of the sample delivery group data packages. A sample delivery group is defined as the samples collected during a sampling effort. The data validation will be performed pursuant to WHC-CM-5-3, *Sample Management and Administration*, Section 2.0, "Validation of RCRA Data".

HASM will prepare a validation report for the analytical data received pursuant to this SAP. When the report is finalized, HASM will transmit the report to the Tank Farms ECO. The Tank Farms ECO will ensure that information from validation reports are included in the characterization report submitted to Ecology.

9.4 Data Reporting

The data collected pursuant to this SAP will be reported in the Contaminated Tank Farms Containerized Soil Characterization Report. The outline for the characterization report is presented in Attachment 3.

This report will include a recommended designation of the tank farms soil based on a review of the analytical data against the MTCA residential standards. If the data shows that listed waste constituents are present above the MTCA residential standards, the report will also include recommendations for alternate management methods.

10.0 Health and Safety

Health and Safety procedures will be followed in accordance with standard Hanford Facility sampling practices. The major health and safety concern will be possible radioactive contamination. Chemical contamination in these soils is expected to be negligible. The Tank Farms ECO, at his/her discretion, will assign health and safety personnel to oversee the sampling efforts. All activities performed under this SAP will be done in accordance with the Tank Farms site-specific Health and Safety Plan (WHC 1993).

If the sampling is to be performed in a radiation zone, the requirements of WHC-CM-1-6, *Radiological Control Manual*, apply to all work performed under this procedure.

All drum sampling activities will comply with the site-specific Health and Safety Plan or Job Safety Analysis (JSA) requirements. A Hazardous Waste Operations Plan (HWOP) is not applicable to these activities. These activities are performed as a result of RCRA Treatment, Storage, and Disposal (TSD) Unit operations. An HWOP is not applicable to TSD Unit Activities as delineated in WHC-CM-4-3, Volume 4, *Health and Safety Program For Hazardous Waste Operations*. As applicable, these documents will include Westinghouse Hanford Company (WHC) procedures and U.S. Department of Energy (DOE) safety requirements for access control, radioactive and hazardous waste monitoring, personal protective equipment, operations, containment, and decontamination.

11.0 References

Ecology, 1993, "Contained-In Policy", Memorandum, Tom Eaton to All Hazardous Waste Staff, dated February 19, 1993.

EPA 1986, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd edition with promulgated Final Update one package dated July 1992.

EPA 1990, CSP-S0001, "Quality Assurance Project Plan for Characterization Sampling and Treatment Tests Conducted For the Contaminated Soil and Debris Program", U.S. Environmental Protection Agency, Richard Kinch, Acting Chief Waste Treatment Branch, Jerry Vorback, Project Manager, November 8, 1990.

WHC 1993, WHC-SD-WM-HSP-002, Rev. 0, "Tank Farms Health and Safety Plan", dated July 21, 1993.

SAMPLING AND ANALYSIS PLAN
FOR CONTAMINATED TANK FARMS CONTAINERIZED SOIL

Attachment 1

MTCA Comparison Summary

In accordance with Ecology's "contained in" policy and Washington Administrative Code, Chapter 173-340, "Model Toxics Control Act--Cleanup", the analytical data submitted to Ecology on the soils analyzed under this Sampling and Analysis Plan (SAP) will be compared to applicable criteria to determine whether the soil "contains" dangerous waste. Specifically, WAC 173-340-700(3)(b) and -740(3) constitute the sections that will be used to complete the MTCA comparison. These sections discuss requirements as they pertain to residential Method B clean up levels. The characterization report will contain the necessary information so that Ecology can review and approve the Tank Farms ECO's recommended designation of the tank farms soil.

MTCA Method B Cleanup requires that several constituent concentration values be compared, and the most stringent value used for comparison with the analytical data. The values relate to both ground water and soil derived numbers. Those categories are also divided into carcinogens and non-carcinogens. In addition to this division, the MTCA comparison is dependent on whether one or multiple constituents exist as contaminants within the soil. If multiple constituents exist, the hazard index must be used as the basis for the comparison, The hazard index is defined as the sum of two or more hazard quotients for multiple substances and/or multiple exposure pathways. Tank farms soils are not considered to be subject to multiple pathway determinations.

Of the constituents applicable to the MTCA comparison listed in attachment 2, only methylene chloride is a carcinogenic constituent. The two comparisons applicable to the data submitted to Ecology will consist of an individual carcinogen and a multiple constituent (including methylene chloride) non-carcinogen hazard index. The following table lists all of the applicable values to be used in the Method B comparison. The value for each constituent which is most stringent that will be used in completing the MTCA comparisons are shaded. All values in the table were obtained from the "July 1993 Update to the Model Toxics Control Act (MTCA) Cleanup Standards Database", dated July 9, 1993 that was issued by Barb Huether, Ecology's Toxics Cleanup Program. The values for ground water have been manipulated in accordance with the language in WAC 173-340-740(3)(a)(ii)(A).

MTCA Soil Residential Method B Formula Values

Chemical	Ground water carcinogen (ug/l)	Ground water non-carcinogen (ug/l)	100 X lowest ground water (mg/kg)	Soil carcinogen (mg/kg)	Soil non-carcinogen (mg/kg)
1,1,1 Trichloro-ethane		7.20 E 2	7.20 E 1		7.20 E 3
Methylene Chloride	5.83 E 0	4.80 E 2	5.83 E -1	1.33 E 2	4.80 E 3
Acetone		8.00 E 2	8.00 E 1		8.00 E 3
Methyl isobutyl ketone		4.00 E 2	4.00 E 1		4.00 E 3
o-cresol		8.00 E 2	8.00 E 1		4.00 E 3
p-cresol		8.00 E 2	8.00 E 1		4.00 E 3
Methyl ethyl ketone		4.80 E 3	4.80 E 2		4.80 E 4

* = Per discussions with Ecology's Toxic Cleanup Program, this value was arrived at by taking the lowest ground water number in ug/l, multiplying it by 100, and converting it to mg/kg using the density of water (1 gr/cm^3).

Attachment 2

Listed Waste Constituents of Concern

Waste Code	Organic Constituent	Process Knowledge	CAS Number
F001	1,1,1 - Trichloroethane	B Plant - Crane Decontamination and degreasing	71-55-6
F002	Methylene Chloride	T Plant - general decontamination	75-09-2
F003	1. Acetone 2. Methyl Isobutyl Ketone	glassware cleaning and drying - no specific facility REDOX solvent extraction	67-64-1 108-10-1
F004	Cresols and Cresylic Acid 1. o-Cresol 2. p-cresol	T Plant general decontamination	 95-48-7 106-44-5
F005	Methyl Ethyl Ketone	analytical laboratory solvent use	78-93-3

Attachment 3

OUTLINE FOR THE CHARACTERIZATION REPORT

A. Title Page

- Include title, Ecology's project mangers name, Ecology office name, address, and date.

B. Introductory Pages

- Provide table of contents, list of tables. and list of figures

C. Section 1.0: Introduction

- Provide a short introduction on the contaminated tank farms containerized soil characterization program.
- Describe the relationship of the characterization program to the overall soil management program within the tank farms. Refer to the Sampling and Analysis Plan when appropriate (which will be presented as an appendix to the characterization report).
- Identify appropriate contact personnel from RL/WHC
- Introduce portions of the characterization report to follow.

D. Section 2.0: Description of Characterization efforts

- Discuss the sampling approach used for the different containers of soil as is relates to the SAP. Identify any deviations from the sampling methodologies. Also discuss any additional information that was obtained from sampling efforts relevant to the discussion.
- Physically describe the soil matrix and provide a narrative on the analytical results as they pertain to the listed constituents identified in attachment 2.
- Provide figures or schematics that indicate the points sampled to obtained the six subsamples for the composited sample(s) for each type of container sampled. Discuss any problems with sample collection that were recorded in the field logbooks.

Attachment 3

OUTLINE FOR THE CHARACTERIZATION REPORT
(Continued)

E. Sampling and Analysis Activities

- Present
  - Dates and schedule of the sampling efforts;
  - Source of the containerized soil:
    - if newly generated, what project, activity, or tank farms;
    - or if from CWC, any available information on where the waste was generated;
  - Overall number of containers sampled;
  - Correlate sample numbers assigned on site to the laboratory sample numbers assigned.
- Discuss any deviations and reference SAP where applicable.

F. Analytical Results

- Present table of detection limits and applicable MTCA values that will used for comparison of all of the analytes from Table 1 of the SAP.
- Present tables with analytical results for the listed waste and heavy metal constituents. Include the dose rate recorded for each sample. Include all data qualifier flags.
- Present the results of the statistical evaluation of the tank farms soil analytical results described in section 4.2.3 of the SAP.

G. Quality Assurance/Quality Control (QA/QC) Data

- Summarize the collection, analytical preparations and transportation arrangements used in the characterization efforts.
- Summarize the laboratories used during the efforts. If laboratories changed during the characterization effort, list the reasons surrounding the substitution.
- Identify the analytical methods used. Reference the SAP when appropriate.

Attachment 3

OUTLINE FOR THE CHARACTERIZATION REPORT
(Continued)

- Summarize any analytical problems. Document any deviations from the SAP. Document any alternative or equivalent procedures used to analyze the samples. Discuss any contacts made with Ecology and/or decisions that Ecology made regarding the continuation of laboratory analysis efforts. Indicate the factors surrounding those decisions and why Ecology was contacted to make those decisions. Reference the SAP section that required Ecology to make that decision.

- Include discussion related to applicable field blanks and well as laboratory instrumentation blanks. Only discuss additional quality assurance/quality control factors such as precision or accuracy if the analytical data was qualified based upon those types of parameters.

- Provide an explanation for each detection limit exceeding 1 ppm for the attachment 2 constituents.

- Present precision and accuracy data of the analytical results. (e.g., matrix spike data). Also present data for analytical blanks.

- Present results from field blanks, if available.

H. Recommendations

- Provide the Tank Farms ECO's recommendations for redesignation of the tank farms soil, based on a review of the analytical data obtained pursuant to this SAP against the MTCA residential standards for the listed waste constituents.

- Provide the Tank Farms ECO's recommendations for alternate safe uses for the soil in lieu of disposal as a mixed waste for any tank farms soil which contains listed waste constituents above the MTCA residential level.

I. References

J. Appendices

- Include the Sampling and Analysis Plan for Contaminated Tank Farms Containerized Soil.

SAMPLE LABEL

WESTINGHOUSE HANFORD SAMPLE

Sample No.: _____

Collector: _____ Matrix: _____

Date Collected: _____ Time: _____

Place Collected: _____

_____

Analysis: _____

_____

SAMPLE SEAL

Westinghouse
Hanford Company

SML LAB SAMPLE DATE_____

DO NOT TAMPER INITIALS_____

Westinghouse Hanford Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	Page 1 of 2 000000

Collector | Company Contact | Telephone

SAF No. | Project Designation | Sampling Locations

Ice Chest No. | Bill of Lading/Airbill No. | Offsite Property No.

Method of Shipment | Field Logbook No.

Shipped to | SPECIAL INSTRUCTIONS

Possible Sample Hazards/Remarks

Special Handling and/or Storage

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required	Preservative

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Chain of Possession Relinquished By (Sign and Print Names)	Date	Time	Received By

*Matrix

A = Air	SE = Sediment
DL = Drum Liquids	SL = Sludge
DS = Drum Solids	SO = Solid
L = Liquid	T = Tissue
O = Oil	W = Water
S = Soil	WI = Wipe
	X = Other

LABORATORY SECTION	Received By	Title	Date/Time
Final Sample Disposition	Disposal Method:	Disposed by:	Date/Time:

Westinghouse Hanford Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	Page 2 of 2 000000

Collector | Company Contact | Telephone

SAF No. | Project Designation | Sampling Locations

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required	Preservative

24

Chain of Possession Relinquished By (Sign and Print Names)	Date	Time	Received By

*Matrix

A = Air
DL = Drum Liquids
DS = Drum Solids
L = Liquid
O = Oil
S = Soil
SE = Sediment
SL = Sludge
SO = Solid
T = Tissue
W = Water
WI = Wipe
X = Other

LABORATORY SECTION	Received By	Title	Date/Time
Final Sample Disposition	Disposal Method:	Disposed by:	Date/Time:

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Author	Addressee	Correspondence No.
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Subject: SAMPLING AND ANALYSIS PLAN FOR CONTAMINATED TANK FARMS CONTAINERIZED SOIL

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